



A Clinical and Mycological Study of Superficial Mycoses in a Tertiary Health Care Centre of Southern Bihar

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ABSTRACT

Introduction: Fungal infections of the skin and its appendages (hairs and nails) known as superficial mycoses are brought on by dermatophytes, yeasts, and non-dermatophyte fungi. Dermatophytosis or ringworm is a frequent superficial fungal skin illness that is more common in tropical and sub-tropical regions like India where temperatures are high for most of the year. Very few studies have been reported on the etiological profile from eastern India that have focused on superficial mycoses.

Materials and Method: 271 skin scrapings were included in the study. To the collected sample, one or two drops of the solution of potassium hydroxide (10% for lesions of the skin, 20–40% for thick hyper-keratotic lesions and nails) were added. A single layer of cells was achieved by applying and pressing down a cover slip. The slide was then examined under light microscope under low magnification and then verified under high magnification.

Results: 95 samples were positive for dermatophytes and 176 tested negatives. Tinea corporis was commonest manifestation in 33.68% cases followed by tinea pedis (24.21%) and tinea cruris (13.68). Tinea Unguium was found in only 3 cases (3.16%). Most of the patients belonged to 16-30 years age group (47.37%) followed by 31-45 (32.63%). There were comparatively more males (60%) than females (40%).

Conclusion: In clinically identified cases where molecular testing is not available to prevent the emergence of drug resistance, identification of the responsible fungal species by direct microscopy and culture is essential.

Keywords: Superficial Mycoses, Dermatophytosis, Skin Scrapings, KOH Mount, Microscopic Examination.

INTRODUCTION

Fungal infections of the skin and its appendages (hairs and nails) known as superficial mycoses are brought on by dermatophytes, yeasts, and non-dermatophyte fungi¹. Fungal infections that are superficial are the most prevalent kind of fungal infections worldwide. The World Health Organization (WHO) reports that 20–25% of people globally have a superficial mycotic infection.²⁻³ The frequency of occurrences differs among nations.³⁻⁵ Due to their global frequency and extensive engagement in the general population, dermatophytes account for the majority of these instances and cause the greatest number of problems.¹⁻⁶

The most significant class of superficial fungal infections is dermatophytosis, which is brought on by dermatophytes, a genus of closely associated keratinophilic fungi that proliferate by consuming the keratin found in skin, hair, and nails.⁵ The three genera of dermatophytes are Trichophyton, Epidermophyton, and Microsporum. Furthermore, dermatophytes can be classified into species that are anthropophilic, zoophilic, or geophilic based on the primary environmental associations that they share. All three types of species have the potential to infect humans.

Numerous unique clinical symptoms associated with dermatophytic infections are named after the affected

anatomic regions. The particular dermatophyte strain that is causing the infection, the host's susceptibility, and the infection site all affect how severe the illness is. Dermatophytic fungal infections affect 20–25% of the world's population, and the frequency of these infections is steadily rising. Any human race is susceptible to dermatological diseases everywhere in the world.⁷

The geographic distribution and frequency of Dermatophytes species vary over time and geographically, and they are influenced by factors such as individual vulnerability, personal cleanliness, and environmental circumstances.^{1,6} The differences in the dermatophytosis distribution pattern are ascribed to social practices, labor migration, military movements, immigration, and frequent international travel⁷. Dermatophytosis or ringworm is a frequent superficial fungal skin illness that is more common in tropical and sub-tropical regions like India where temperatures are high for most of the year^{6,8}.

Because of the strong monsoons and year-round high relative temperature and humidity in North and East India, the region has a high atmospheric moisture content, which slows sweat evaporation and promotes fungal growth, which in turn leads to a high prevalence of fungal diseases⁹. Non-dermatophytes have produced lesions that are clinically comparable to those brought on by Dermatophyte infections throughout the past few decades



as causes of superficial fungal infection among human beings⁸.

Despite being widespread, the exact scope of the issue is impossible to quantify. The fact that mycosis affects one-fifth of the world's population has drawn more attention in recent years to research on dermatophytosis in India¹⁰. Few studies have been reported on the etiological profile from eastern India, and even fewer have been conducted in the southern part of Bihar that have focused on superficial mycoses, despite the fact that many studies on the clinic-mycological characteristics of dermatophytosis have been carried out in other regions of India.

Aims/Objective:

- To find the prevalence of Superficial mycoses in a tertiary health care centre of Southern Bihar.
- To assess the clinical profile of the Superficial mycoses cases in eastern India.

MATERIALS AND METHODS

This was an observational and prospective study carried out from June 2022 to May 2023 (12 months) in Department of Microbiology, NMCH, Sasaram, Bihar (a tertiary care centre in eastern India). The study was conducted under the guidelines of Good Clinical Practice and Good Laboratory Practice.

Inclusion criteria: All the patients of dermatophytosis of any age groups and both sexes, who gave their consent, were included in the study.

Exclusion criteria: Patients treated with antifungals or topical steroids in recent past were excluded from the study.

Sample Size: Consecutive sampling was done and 271 skin scrapings were included in the study.

Procedure

Materials needed: Cotton swab, 10% KOH (potassium hydroxide) solution, blunt scalpel, black paper, sheet clip, tag, glass slide, cover-slip, and spirit lamp or Bunsen burner.

Collection of specimens: The skin's most severely infected region or the lesion's active edge were used to gather the scrapings.^{11,12}

Above the location, the skin was lifted. To get scrapings, the blunt scalpel edge was slid across the skin while the scalpel was held upright against the skin. The skin scrapings were collected in a black sheet. This keeps the specimen dry, makes it easier to see the skin debris, and stops contamination and bacterial growth. Notes were made regarding the patient's medical history, the precise location of the lesion, and the day and time the specimen was collected.¹¹

The sample was cautiously moved to a glass slide with a label. To the collected sample, one or two drops of the solution of potassium hydroxide (10% for lesions of the

skin, 20–40% for thick hyper-keratotic lesions and nails) were added. A single layer of cells was achieved by applying and pressing down a cover slip. Little pieces of filter paper were used to blot away any leftover KOH. The KOH mounted samples were allowed to decompose and clear for 30 to 60 minutes if the lesions were dense and hyperkeratotic.

Microscopic examination: The light microscope had the slide installed. When first seen, it was through a low power objective lens. Examining the sample via a higher power lens (20× or 40) verified the presence of fungus if noticed under low power magnification.¹¹

Statistical Analysis: Data collected from the microbiological tests were entered into tabular form using Microsoft Excel 2019 and then transferred to Graph Pad version 8.4.3 for further statistical analysis. Descriptive statistics was used to express and compare the findings using frequency and percentage.

OBSERVATIONS AND RESULTS

A total of 270 samples of KOH mount of 271 skin scrapings were analysed out of which 95 samples were positive for dermatophytes and 176 tested negatives.

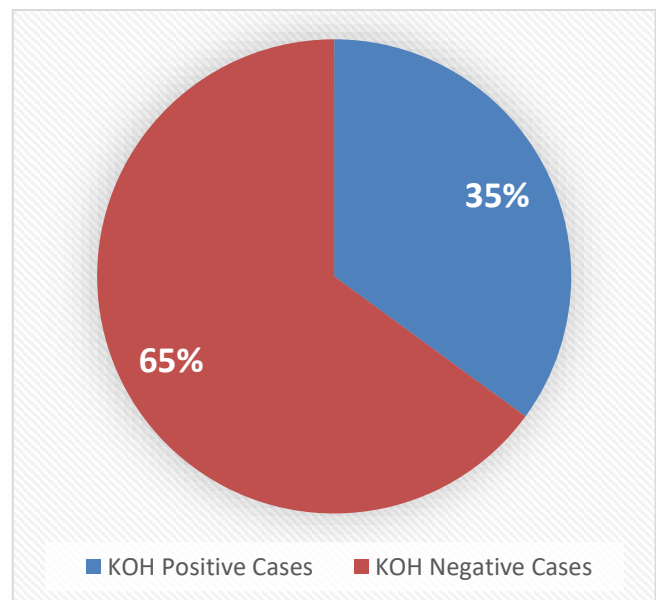


Figure 1: Result of Direct Microscopic Examination by KOH Mount

Table 1: Age and Sex Distribution of Patients with Superficial Mycosis (n=95)

Age in Years	Male	Female	Total (%)
1-15	4	5	9 (9.47)
16-30	24	21	45 (47.37)
31-45	21	10	31 (32.63)
46-50	7	2	9 (9.47)
>60	1	0	1 (1.05)
Total (%)	57 (60.00)	38 (40.00)	95 (100.00)

Most of the patients belonged to 16-30 years age group (47.37%) followed by 31-45 (32.63%). There were comparatively more males (60%) than females (40%).

Table 2: Prevalence Distribution of Various Types of Dermatophytosis

Type of Dermatophytosis	Number of Patients	% of Patients (n=95)
Tinea Corporis	32	33.68
Tinea Pedis	23	24.21
Tinea Cruris	13	13.68
Tinea Capitis	8	8.42
Tinea Manuum	7	7.37
Tinea Barbae	5	5.26
Tinea Faciei	5	4.21
Tinea Unguium	3	3.16

Tinea corporis was commonest manifestation in 33.68% cases followed by tinea pedis (24.21%) and tinea cruris (13.68). Tinea Unguium was found in only 3 cases (3.16%).

Table 3: Occupational Distribution of Positive Cases of Dermatophytosis

Occupation	Number of Patients	% of Patients (n=95)
Unskilled Labour	42	44.21
Skilled Labour	24	25.26
Housewife	15	15.79
Student	14	14.74

Most of the patient’s worked as unskilled labour which indicate that improper personal hygiene could be the reason of the dermatophytosis.

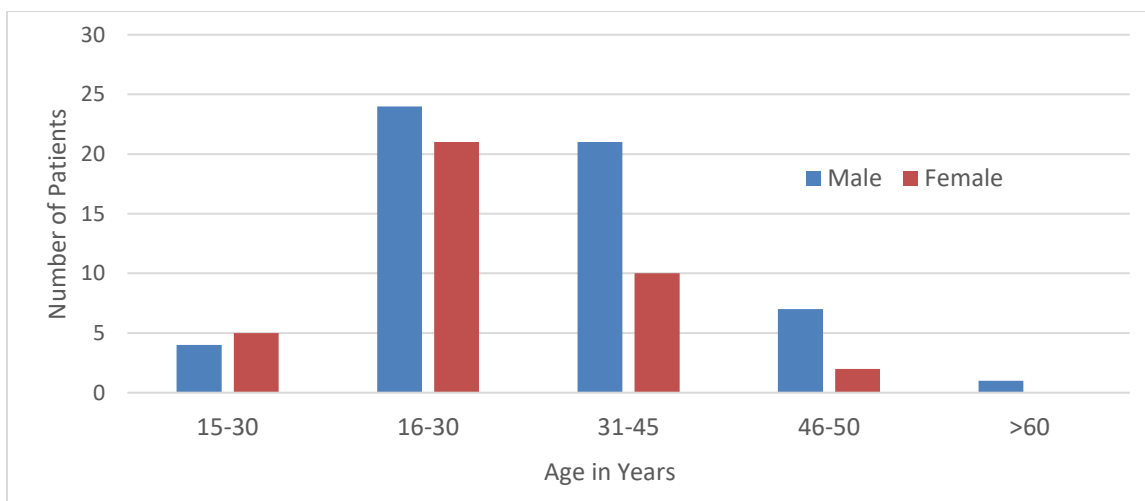


Figure 2: Age and Sex Distribution of Patients with Superficial Mycosis

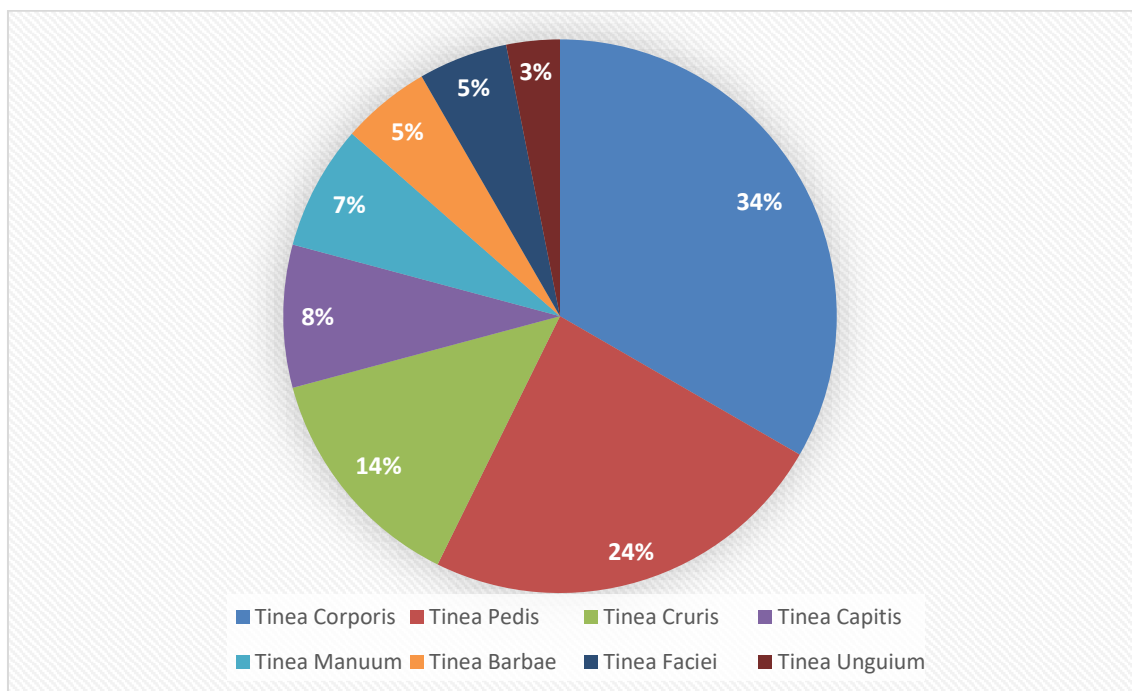


Figure 3: Prevalence Distribution of Various Types of Dermatophytosis

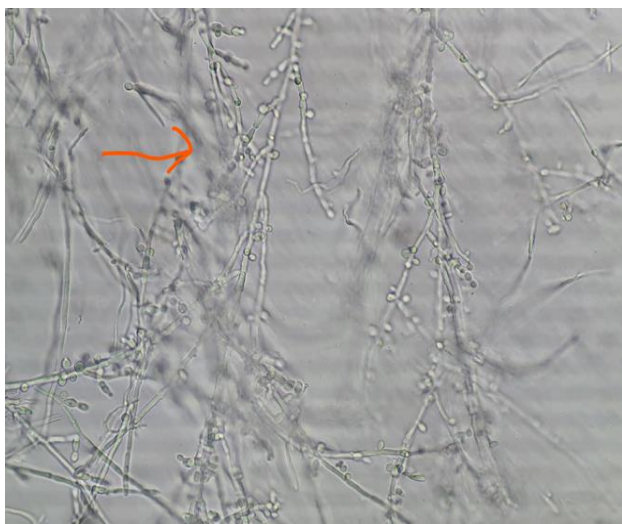


Figure 4: Slide showing Refractile, long, smooth, branching, septate hyphal filaments in dermatophytosis

DISCUSSION

According to this study, 33.2% of patients at a tertiary care hospital of southern Bihar had superficial mycoses. Kerala researchers Lavanya V and S.S. Solabannavar⁶ also reported a similar incidence of 33%. According to a clinic-epidemiological study conducted in Northern Assam by Sharma S et al.¹³ 61% of people had dermatophytosis and superficial mycoses. Additionally, 51% was discovered in Guwahati, Assam, by Sen. S. S. et al.¹⁴ However, a hospital-based study conducted by Lt Col P Roy and Wing Commander Sanjiv Grover⁹ from Northeast India reported a 79% prevalence, which may be related to troops' prolonged use of closed shoes and uniforms in all weather conditions, which creates an environment that is favourable to the growth of fungi.

The ratio of men to women was roughly 3:2. Some previous researches have shown a majority of men.¹⁵⁻¹⁷ Males may experience a higher incidence because to increased sweating, physical activity, and the use of occlusive clothes. A small number of past research have indicated a majority of females; females are primarily affected by onychomycosis, tinea pedis, and manuum as a result of domestic and cooking tasks.^{18,19}

Ten years later, A. Naglot et al. did a study in the Army Base Hospital in Tezpur, Assam, and discovered that the rate of Dermatophytosis alone was 59.6%. In a hospital-based study conducted by Bindu V et al. in the skin department of Calicut Medical College, a prevalence of 45.3% was reported.²⁰ KAK Surendran et al.²¹ from Mysore discovered a 74% frequency. Similarly, 72% frequency was observed by Janardhan B et al. in Telangana.²²

In agreement with the current investigation, Naglot A et al.,⁷ from Tezpur, Assam; Sen SS et al.,¹⁴ from Guwahati, Assam; and Sharma et al. [Shikkim] also reported that Tinea corporis was the most common manifestation of Superficial mycosis.²³ In their individual investigations, Kumar S et al.,¹⁰ Agarwal US et al.,²⁴ and Mahajan S et al.,²⁵ from different regions of North India similarly discovered that tinea

corporis was the most typical presentation of superficial mycosis. Further support for this has come from research conducted in South India by Lavanya V et al.,⁶ Lakshmanan A et al.,³ Bindu V et al.,²⁰ KAK Surendran et al.,²¹ and Vani G et al.²²

In terms of occupational associations, it was also discovered that unskilled manual labor was connected with a higher prevalence of superficial mycoses. Higher incidence could be brought on by crowded living conditions and inadequate hygiene in lower socioeconomic areas.

CONCLUSION

The most prevalent clinical pattern, as shown by the current clinical and mycological study, is tinea corporis, which is followed by tinea cruris. In clinically identified cases where molecular testing is not available to prevent the emergence of drug resistance, identification of the responsible fungal genera and/or species by direct microscopy and culture is essential. This is because different fungal diseases run different disease courses, therapeutic options vary in each case, and some yeast-like isolated strains are intrinsically resistant to some anti-fungal drugs.

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